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## 7. Sign Lighting

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### 7.1 Overview

The Sign Lighting Standards conserve energy, reduce peak electric demand, and are technically feasible and cost effective. They set minimum control requirements, maximum allowable power levels and minimum efficacy requirements.

The Standards do not allow trade-offs between sign lighting power allowances and other end uses including outdoor lighting, indoor lighting, HVAC, building envelope, or water heating.

#### 7.1.1 History and Background

Regulations for lighting have been in effect in California since 1977, but until the adoption of the 2005 Standards only addressed indoor lighting, inside spaces that were air conditioned or heated, and outdoor lighting that was connected to a lighting panel when the lighting panel was located inside a conditioned building. The 2005 Standards expanded the scope to include most outdoor lighting applications, indoor and outdoor sign lighting applications, and indoor lighting applications in unconditioned buildings. After the 2005 Standards, the Sign Lighting Standards were updated with the 2008 Standards.

The 2013 Sign Lighting Standards evolved over a three year period through a dynamic, open, public process. The Energy Commission solicited ideas, proposals, and comments from a number of interested parties, and encouraged all interested persons to participate in a series of public hearings and workshops through which the Energy Commission gathered information and viewed presentations on energy efficiency possibilities from a variety of perspectives. The Energy Commission hired a consulting team that included a number of nationally recognized lighting experts to assist in the development of the Standards.

#### 7.1.2 Scope and Application

The 2013 Sign Lighting Standards address both indoor and outdoor signs. The Standards include control requirements for all illuminated signs (§130.3), as well as establish lighting power requirements for internally illuminated and externally illuminated signs (§140.8).

The Sign Lighting Standards are the same throughout the state and are independent of outdoor Lighting Zones.

The Sign Lighting Standards are the same in conditioned and unconditioned spaces.

### 7.1.3 Summary of Requirements

§110.9, §130.0, §130.3, §140.8 and §141.0
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#### A. Mandatory Measures

The Standards require that indoor and outdoor sign lighting be automatically controlled.

In brief, the mandatory sign lighting requirements include:

- Automatic shutoff controls,
- Dimming controls, and
- Demand responsive controls for electronic message centers

All lighting controls must meet the requirements of §110.9 as applicable. Most lighting controls must be certified by the manufacturer to the Energy Commission and required to be listed in the Energy Commission directories. Additionally, self-contained lighting control devices are now regulated by the Title 20 Appliance Efficiency Regulations. More details on the mandatory measures are provided in section 7.2 of this chapter.

#### B. Sign Lighting Power

Sign Lighting Standards apply to both indoor and outdoor signs and contain two different prescriptive compliance options:

1. The watt per square foot approach specifies a maximum lighting power that can be installed, expressed in W/ft<sup>2</sup> of sign area.
2. The specific technology approach specifies that the signs shall be illuminated with efficient lighting sources (electronic ballasts, high efficacy lamps, efficient power supplies and efficient transformers).

More details on the sign lighting power requirements are provided in section 7.3 of this chapter.

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## 7.2 Mandatory Measures

The mandatory features and devices are required for all sign lighting projects as applicable. The mandatory measures require that lighting controls are certified by the manufacturers to the Energy Commission, and that sign lighting systems have controls for efficient operation. Mandatory features also set requirements for how lighting systems are classified according to technology, and how to calculate installed wattage.

Mandatory measures for signs are specified in §110.9, §130.0, and §130.3. These mandatory measures for signs are similar to the mandatory measures for the other indoor and outdoor lighting Standards.

### 7.2.1 Mandatory Measures Note Block:

For projects that involve building plans, the person with overall responsibility must ensure that the Mandatory Measures that apply to the project are listed on the plans. The format of the list is left to the discretion of the Principal Designer.

### 7.2.2 Certification Requirements for Lighting Control Devices

§100.0(h)

The Standards limit the installation of lighting control devices and systems as follows:

- A. For all lighting control devices that are regulated by the Title 20 Appliance Efficiency Regulations, installation shall be limited to those that have been certified to the Energy Commission by their manufacturer, pursuant to the provisions of Title 20 Cal. Code of Regulations, §1606, to meet or exceed minimum specifications or efficiencies adopted by the Commission.
- B. For lighting control devices required to be Certified to the Energy Commission according to Title 24, which are not regulated by Title 20, installation shall be limited to those certified by the manufacturer in a declaration, executed under penalty of perjury under the laws of the State of California, that all the information provided pursuant to the certification is true, complete, accurate and in compliance with all applicable provisions of The Standards; and if applicable that the equipment, product, or device was tested under the applicable test method specified in the Standards

See chapter 5.2 of the 2013 Nonresidential Compliance Manual for additional information about the requirements for lighting control devices, and lighting control systems.

### 7.2.3 Title 20 Certification Requirements for Lighting Control Devices

§110.1

- A. Any lighting control device regulated by the Appliance Efficiency Regulations, Title 20 California Code of Regulations, §1601 et seq., may be installed only if the appliance fully complies with those regulations. The Title 20 regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment.
- B. Once a device is certified, it will be listed in the Directory of Lighting Control Devices, which is available from the link below:  
<http://www.energy.ca.gov/appliances/database/>  
Call the Energy Hotline at 1-800-772-3300 to obtain more information.
- C. Self-contained lighting control devices are defined by the Title 24 Building Energy Efficiency Standards, and by the title 20 Appliance Efficiency Regulations, as unitary lighting control modules that require no additional components to be fully functional lighting controls.

Self-contained lighting controls required for compliance with the Title 24 Standards are required to be certified by the manufacturer according to the Title 20 Appliance Efficiency Regulations. Following are types of lighting controls that are required to be certified to the Energy Commission in accordance with Title 20:

1. Time-Switch Lighting Controls
  - Automatic Time-Switch Controls
  - Astronomical Time-Switch Controls
  - Multi-Level Astronomical Time-Switch Controls
  - Outdoor Astronomical Time-Switch Controls
2. Daylighting Controls
  - Automatic Daylight Controls
  - Photo Controls
3. Dimmers
4. Occupant Sensing Controls
  - Occupant Sensors
  - Motion Sensors
  - Vacancy Sensors

**D. Demand Responsive Lighting Controls.** The following information is for Electronic Message Centers when they are required to have demand responsive controls according to §130.3(a)3.

1. **Definitions** - Following are definitions in §100.1:
  - a. *DEMAND RESPONSE is short-term changes in electricity usage by end-use customers, from their normal consumption patterns. Demand response may be in response to:*
    - *Changes in the price of electricity; or*
    - *Participation in programs or services designed to modify electricity use*
    - *In response to wholesale market prices or*
    - *When system reliability is jeopardized.*
  - b. *DEMAND RESPONSE PERIOD is a period of time during which electricity loads are modified in response to a demand response signal.*
  - c. *DEMAND RESPONSE SIGNAL is a signal sent by the local utility, Independent System Operator (ISO), or designated curtailment service provider or aggregator, to a customer, indicating a price or a request to modify electricity consumption, for a limited time period.*
  - d. *DEMAND RESPONSIVE CONTROL is a kind of control that is capable of receiving and automatically responding to a demand response signal.*

**2. Demand Responsive Controls and Equipment.**

§130.5(e)

Demand responsive controls and equipment shall be capable of receiving and automatically responding to at least one standards' based messaging protocol which enables demand response after receiving a demand response signal.

#### 7.2.4 Using Lighting Control Systems to Comply with the Standards

- A. Lighting Control Systems are defined by the Title 24 Building Energy Efficiency Standards as requiring two or more components to be installed in the building to provide all of the functionality required to make up a fully functional and compliant lighting control. Lighting control systems may be installed for compliance with lighting control requirements in the Standards providing they meet all of the applicable requirements,
- B. A lighting control system shall comply with all requirements listed below; and all components of the system considered together as installed shall meet all applicable requirements for the lighting control application for which they are installed as required in the Standards.
- C. Before a Lighting Control System (including an EMCS) can be recognized for compliance with the lighting control requirements in Part 6 of Title 24, the person who is eligible under Division 3 of the Business and Professions Code to accept responsibility for the construction or installation of features, materials, components, or manufactured devices shall sign and submit an Installation Certificate (§130.4(b) 1 and 2; §130.5(f)).
- D. If any of the requirements in the Installation Certificate fail the installation tests, the Lighting Control System (or EMCS) shall not be recognized for compliance with Title 24
- E. If there are indicator lights that are integral to a lighting control system, they shall consume no more than one watt of power per indicator light.
- F. A lighting control system shall meet all of the requirements in the Title 20 Appliance Efficiency Regulations for each of the identical self-contained lighting control devices that it is installed to function as.

Following are the Title 20 requirements for lighting control devices, which lighting control systems installed to comply with Title 24 must meet:

- 1. **Automatic Time-Switch Controls.** Commercial automatic time-switch controls labeled for use with lighting shall:
  - a. Have program backup capabilities that prevent the loss of the device's schedule for at least 7 days, and the device's date and time for at least 72 hours if power is interrupted;
  - b. Be capable of providing manual override to each connected load and shall resume normally scheduled operation after manual override is initiated within 2 hours for each connected load; and
  - c. Incorporate an automatic holiday shutoff feature that turns off all connected loads for at least 24 hours and then resumes normally scheduled operation.

2. **Astronomical Time-Switch Controls.** Astronomical time-switch controls shall:
  - a. Meet the requirements of an automatic time-switch control;
  - b. Have sunrise and sunset prediction accuracy within plus-or-minus 15 minutes and timekeeping accuracy within 5 minutes per year;
  - c. Be capable of displaying date, current time, sunrise time, sunset time, and switching times for each step during programming;
  - d. Have an automatic daylight savings time adjustment; and
  - e. Have the ability to independently offset the on and off for each channel by at least 99 minutes before and after sunrise or sunset.
3. **Automatic Daylight Controls.** Automatic daylight controls shall:
  - a. Be capable of reducing the power consumption in response to measured daylight either directly or by sending and receiving signals;
  - b. Comply with §1605.3(l)(2)(F) of Title 20 if the day lighting control is capable of directly dimming lamps;
  - c. Automatically return to its most recent time delay settings within 60 minutes when put in calibration mode;
  - d. Have a set point control that easily distinguishes settings to within 10 percent of full scale adjustment;
  - e. Have a light sensor that has a linear response within 5 percent accuracy over the range of illuminance measured by the light sensor;
  - f. Have a light sensor that is physically separated from where the calibration adjustments are made, or is capable of being calibrated in a manner that the person initiating the calibration is remote from the sensor during calibration to avoid influencing calibration accuracy; and
  - g. Comply with §1605.3(l)(2)(E) of Title 20 if the device contains a photo control component.
4. **Photo Controls.** Photo controls shall not have a mechanical device that permits disabling of the control.
5. **Dimmer Controls.** All dimmer controls shall:
  - a. Be capable of reducing power consumption by a minimum of 65 percent when the dimmer is at its lowest level;
  - b. Include an off position which produces a zero lumen output; and



- c. Not consume more than 1 watt per lighting dimmer switch leg when in the off position.
- d. Dimmer controls that can directly control lamps shall provide electrical outputs to lamps for reduced flicker operation through the dimming range so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz without causing premature lamp failure.
- e. Wall box dimmers and associated switches designed for use in three way circuits shall be capable of turning lights off, and to the level set by the dimmer if the lights are off.

## 7.2.5 Determining Sign Lighting Installed Power

### §130.0(c)

The lighting wattage of signs shall be determined in accordance with the applicable provisions of §130.0(c). Note that the installed wattage of sign lighting is not considered for compliance when using the Alternate Lighting Source compliance option in §140.8(b). See section 7.4 of this chapter for more information about sign lighting energy requirements.

Following are the most common sign lighting requirements for determining luminaire classification and power:

- A. The wattage of luminaires with line voltage lamp holders not containing permanently installed ballasts or transformers shall be the maximum relamping rated wattage of the luminaire;
- B. Screw-based adaptors shall not be used to convert an incandescent luminaire to any type of non-incandescent technology. Screw-based adaptors, including screw-base adaptors classified as permanent by the manufacturer, shall not be recognized for compliance with Part 6.
- C. The wattage of luminaires with permanently installed or remotely installed ballasts shall be the operating input wattage of the rated lamp/ballast combination published in ballast manufacturer's catalogs based on independent testing lab reports as specified by UL 1598.
- D. The wattage of luminaires and lighting systems with permanently installed or remotely installed transformers shall be the rated wattage of the lamp/transformer combination.
- E. The wattage of light emitting diode (LED) luminaires, and LED light engines shall be the maximum rated input wattage of the system when tested in accordance with IES LM-79-08.
  - o An LED lamp, integrated or non-integrated type in accordance with the definition in ANSI/IES RP-16-2010, shall not be classified as a LED lighting system for compliance with Part 6. LED modules having screw-bases including screw based pig-tails, screw-based sockets, or screw-based adaptors shall not be recognized as a LED lighting system for compliance with Part 6.

The rules for determining lighting wattage are discussed in greater detail in Chapter 5 of the Nonresidential Compliance Manual.

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## 7.3 Required Sign Lighting Controls

### 7.3.1 Indoor Sign Lighting Controls

§130.3(a)1

All indoor sign lighting is required to be controlled with an automatic time-switch control or astronomical time-switch control. These controls are required to meet the minimum requirements in §110.9. See section 7.2 of this chapter for information on the minimum requirements for lighting controls.

### 7.3.2 Outdoor Sign Lighting Controls

§130.3(a)2

Outdoor sign lighting is required to meet the following requirements as applicable:

A. All outdoor sign lighting is required to be controlled with one of the following two options:

1. A photocontrol in addition to an automatic time-switch control, or
2. An astronomical time-switch control.

These controls are required to meet the minimum requirements in §110.9. See section 7.2 of this chapter for information on the minimum requirements for lighting controls.

B. EXCEPTION: Lighting for the following outdoor signs is not required to be controlled by a photocontrol, automatic time-switch control, or astronomical time-switch control:

1. Lighting for outdoor signs in tunnels, and for signs in large permanently covered outdoor areas that are intended to be continuously lit, 24 hours per day and 365 days per year.

C. All outdoor sign lighting that is ON both day and night shall be controlled with a dimmer that provides the ability to automatically reduce sign lighting power by a minimum of 65 percent during nighttime hours.

Signs that are illuminated at night and for more than 1 hour during daylight hours shall be considered ON both day and night.

2. EXCEPTION.: Lighting for the following outdoor signs is not required to be controlled by dimmer:

- a. Lighting for outdoor signs in tunnels and large covered areas that are intended to be illuminated both day and night.

### 7.3.3 Demand Responsive Lighting Controls for Electronic Message Centers

An Electronic Message Center (EMC) that has a new connected lighting power load of greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal.

EXCEPTION to §130.3(a)3

Lighting for an EMC that is not permitted by a health or life safety statute, ordinance, or regulation to be reduced by 30 percent is not required to be capable of reducing the lighting power when receiving a demand response signal.

#### Example 7-1

##### Question

Because the Standards require sign lighting to be controlled by an automatic time switch control, will a sign on the inside of a mall be required to be turned off during the day?

##### Answer

No, the signs will not be required to be turned off during the day. The automatic time switch control will allow the owner/occupant to program their signs to be automatically turned on and off in accordance with their particular needs.

## 7.4 Sign Lighting Energy Requirements

### 7.4.1 Scope of Sign Lighting Energy Requirements

The Sign Lighting Energy Requirements apply to all internally illuminated (cabinet) signs, externally illuminated signs, unfiltered light emitting diodes (LEDs), and unfiltered neon, whether used indoors or outdoors. Examples are internally illuminated and externally illuminated signs, including billboards, and off-premise and on-premise signs.

### 7.4.2 Applications Excluded from Sign Lighting Energy Requirements

The following sign lighting applications are not required to comply with the sign lighting energy requirements. However, these exceptions do not apply to other applicable requirements of the Standards, unless also specifically excluded in that section of the Standards

Unfiltered incandescent lamps that are not part of an electronic message center (EMC), an internally illuminated sign, or an externally illuminated sign. This exception applies only to portions of a sign that are unfiltered incandescent lamps. An unfiltered sign is defined in the Standards as a sign where the viewer perceives the light source directly as the message, without any colored filter between the viewer and the light source. Although internally illuminated signs are mentioned in this exception, it is only those portions of a hybrid sign consisting of unfiltered incandescent lamps that are excluded from the sign lighting energy requirements.

- A. Exit signs. However, exit signs are required to meet the requirements of the Appliance Efficiency Regulations.
- B. Traffic Signs. However, traffic signs are required to meet the requirements of the Appliance Efficiency Regulations.

### 7.4.3 Summary of Two Sign Lighting Energy Compliance Options

There are two options available for complying with the sign lighting energy requirements:

**Option 1** - Maximum Allowed Lighting Power, or

**Option 2** - Menu of Compliant Lighting Sources

### 7.4.4 Option 1: Maximum Allowed Lighting Power Compliance

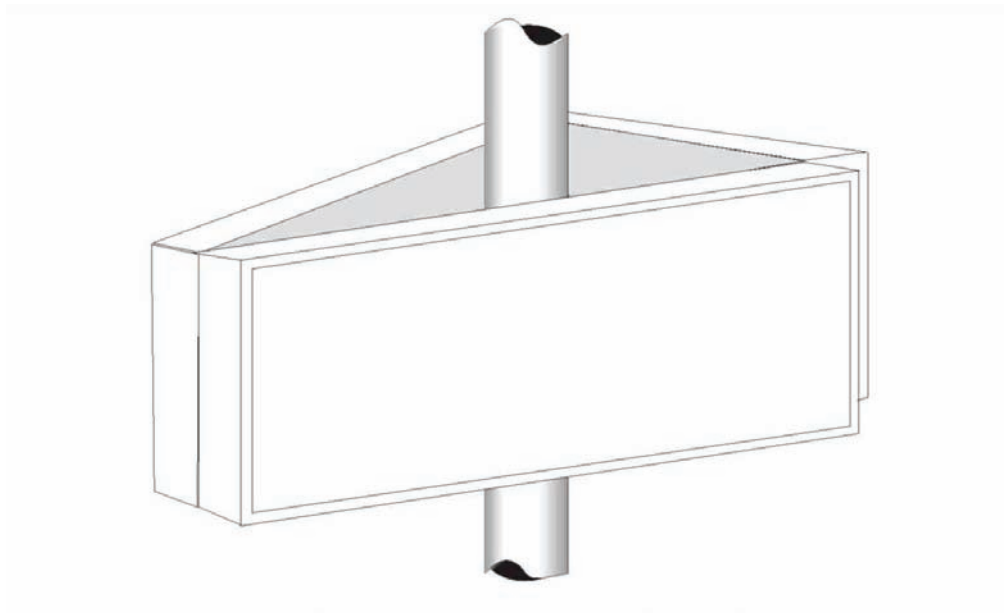
§140.8(a)
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Option one for complying with the sign lighting energy requirements is the Maximum Allowed Lighting Power option, also known as the watts per square foot approach. When using this option, there are rules in the Standards for classifying the lighting technology used, and for determining sign lighting power. Additional information about Sign Lighting Installed Wattage is in section 7.2.5 of this chapter.

The maximum allowed lighting power is different for internally illuminated signs and for externally illuminated signs, as follows:

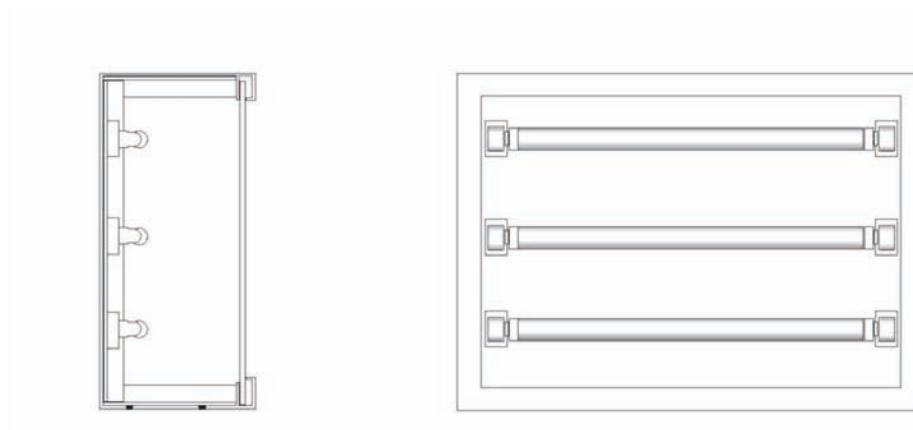
- A. For internally illuminated signs, the maximum allowed lighting power is 12 watts per square foot of the illuminated sign area. For double-faced signs, only the area of a single face shall be used to determine the allowed lighting power.
  - *Internally illuminated signs are defined in the Standards as signs that are illuminated by a light source that is contained inside a sign where the message area is luminous, including cabinet signs and channel letter signs.*
- B. For externally illuminated signs, the maximum allowed lighting power is 2.3 watts per square foot of the illuminated sign area. Only areas of an externally lighted sign that are illuminated without obstruction or interference, by one or more luminaires, shall be used.
  - *Externally illuminated signs are defined in the Standards as any sign or a billboard that is lit by a light source that is external to the sign directed towards and shining on the face of the sign.*

Lighting for unfiltered light emitting diodes (LEDs) and unfiltered neon are not required to comply with the maximum allowed lighting power option, but are required to comply with the alternate lighting source compliance method.

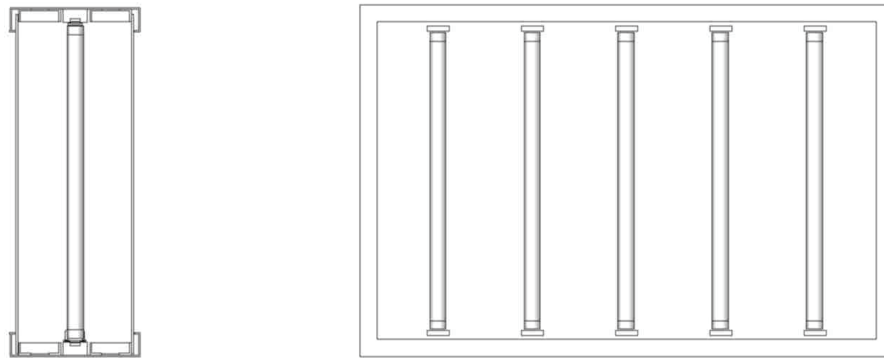


*Figure 7-1 – Multi-faced sign*

*Include Area from Each Face When Separated by Opaque Divider*



*Figure 7-2 – Single-faced Internally Illuminated Cabinet Sign with Fluorescent Lamp and Translucent Face*



*Figure 7-3 – Double-faced Internally Illuminated Cabinet Sign with Fluorescent Lamp and Translucent Faces*

#### 7.4.5 Option 2 – Menu of Compliant Lighting Sources

§140.8(b)

Option 2 for complying with the sign lighting energy requirements is to use only lighting technologies listed on the menu of compliant lighting sources. When using this option for compliance, the rules for determining sign lighting power do not apply because there are no requirement to calculate lighting power with this compliance option.

**Menu of Compliant Lighting Sources** A sign complies if it is equipped only with one or more of the following light sources:

- A. High pressure sodium lamps; or
- B. Metal halide lamps that are:
  - 1. Pulse start or ceramic served by a ballast that has a minimum efficiency of 88 percent or greater; or
  - 2. Pulse start that meet all of the following requirements:
    - a. Can only use metal halide lamps that are 320 watts or smaller, and
    - b. Cannot use a lamp that is 250 watts, and
    - c. Cannot use a lamp that is 175 watts,
    - d. And the lamps are served by a ballast that has a minimum efficiency of 80 percent.

Ballast efficiency is the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005.

C. Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to following:

1. A minimum efficiency of 75 percent when the transformer or power supply rated output current is less than 50 mA; or
2. A minimum efficiency of 68 percent when the transformer or power supply rated output current is 50 mA or greater.

The ratio of the output wattage to the input wattage is at 100 percent tubing load.

D. Fluorescent lighting systems meeting one of the following requirements:

1. Use only lamps with a minimum color rendering index (CRI) of 80; or
2. Use only electronic ballasts with a fundamental output frequency not less than 20 kHz.

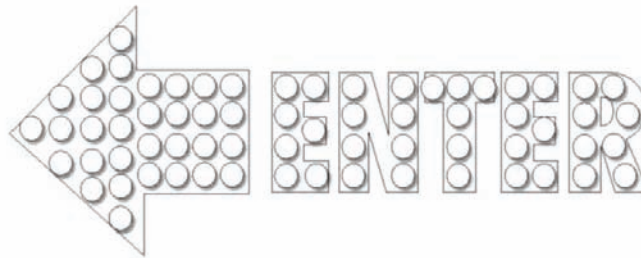
E. Light emitting diodes (LEDs) with a power supply having an efficiency of 80 percent or greater; or

EXCEPTION to §140.8(b)5: Instead of requiring a power supply with an efficiency of 80 percent or greater, single voltage external power supplies that are designed to convert 120 volt AC input into lower voltage DC or AC output, and which have a nameplate output power less than or equal to 250 watts, shall be certified to comply with the applicable requirements for external power supplies in the Appliance Efficiency Regulations (Title 20).

F. Compact fluorescent lamps that do not contain a medium screw base sockets (E24/E26).

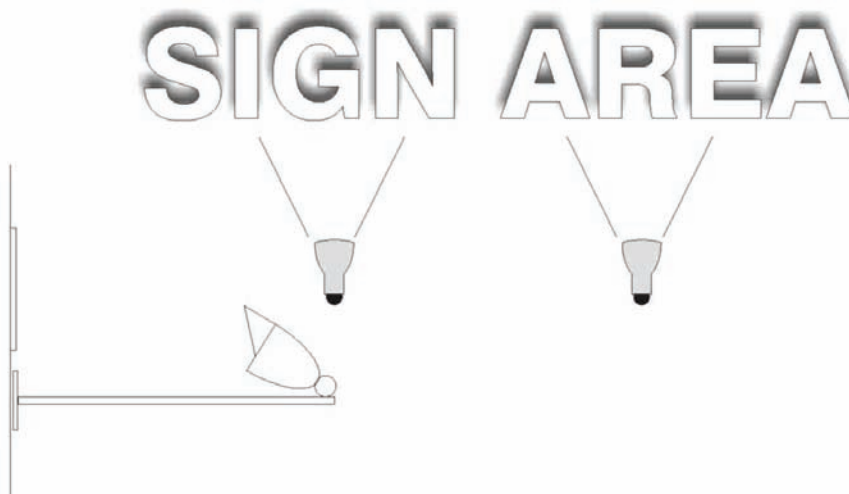
### 7.4.6 Hybrid Signs

A sign may consist of multiple components, where some components are regulated, and some components are not regulated. For example, a single sign structure may have a regulated internally illuminated cabinet, plus regulated externally illuminated letters which are attached to a brick pedestal, plus unregulated unfiltered incandescent “chaser” lamps forming an illuminated arrow. For example, Figure 7-4 shows an arrow which is not part of an electronic message center (EMC) using incandescent lamps. If the lamps are not covered by a lens, then only the control regulations (§130.3) apply to the sign. This type of unfiltered incandescent sign is not regulated by §140.8.



*Figure 7-4 – Unfiltered Sign*

Figure 7-5 shows an externally illuminated sign using flood lighting, which is regulated by the Standards. The power (wattage) used for these lighting components must comply with the watts per square foot approach, or use only lighting technologies approved according to §140.8(b).



*Figure 7-5 – Externally Illuminated Sign Using Flood Lighting*



**Example 7-2****Question**

Can I use neon or cold cathode lights in my sign and comply with the Standards under Alternative 2 (Specific Technology Approach)?

**Answer**

Yes, neon and cold cathode lights are allowed under the alternate light source compliance option, provided that the transformers or power supplies have an efficiency of 75 percent or greater for output currents less than 50 mA and 68 percent or greater for output currents 50 mA or greater.

**Example 7-3****Question**

Do signs inside a theater lobby or other indoor environments need to comply with the sign requirements?

**Answer**

Yes, all internally and externally illuminated signs whether indoor or outdoor must comply with either the Maximum Allowed Lighting Power or Alternate Lighting Sources compliance option.

**Example 7-4****Question**

My sign is equipped with both hardwired compact fluorescent lamps and incandescent lamps. Can my sign comply under the specific technology approach?

**Answer**

No. Since your sign is not exclusively equipped with energy efficient technologies allowed under the Alternate Lighting Sources compliance option (incandescent sources are not allowed), it therefore must comply under the Maximum Allowed Lighting Power compliance option. Your other option is to replace the incandescent sources with an energy efficient option that is permitted under the specific technology approach, such as hard-wired LED, pulse start or ceramic metal halide, or hard-wired CFL sources.

**Example 7-5****Question**

My sign has three parts, an internally illuminated panel sign equipped with electronic ballasts, and two unfiltered 30 mA neon signs on top and bottom of the panel sign displaying an illuminated arrow equipped with power supplies with an efficiency of 76 percent. Do this sign comply with the specific technology approach?

**Answer**

Yes, this sign is essentially made up of three different signs; an internally illuminated panel sign equipped with electronic ballast that complies with the specific technology approach and two unfiltered neon signs with efficient power supplies also that comply with the specific technology approach. Therefore the entire sign complies with the Standards.

**Example 7-6****Question**

Are signs required to comply with Outdoor Lighting Zone requirements?

**Answer**

No. Outdoor Lighting Zones do not apply in any way to signs. The Sign Lighting Standards are the same throughout the state; they do not vary with Outdoor Lighting Zones.

## 7.5 Additions and Alterations

§141.0(a)1, §141.0(b)1H

All new signs, regardless of whether they are installed in conjunction with an indoor or outdoor addition or alteration to a building or outdoor lighting system, must meet the requirements for newly installed equipment, as required by §110.9, §130.0, §130.3 and §140.8.

### 7.5.1 Sign Alterations

§141.0(b)1K

Existing indoor and outdoor internally illuminated and externally illuminated signs that are altered as specified by §141.0(b)1K are required to meet the requirements of §140.8. Altered components of existing indoor and outdoor internally and externally illuminated signs must also meet the requirements of §130.0.

The lighting power requirements (either specific technology or watts per square foot) are triggered by alterations to existing internally or externally illuminated signs when any of the following occurs as result of the alteration as specified in §141.0(b)2:

- A. The connected lighting power is increased.
- B. More than 50 percent of the ballasts are replaced and rewired.
- C. The sign is relocated to a different location on the same site or on a different site.

The lighting power requirements are not triggered when just the lamps are replaced, the sign face is replaced or the ballasts are replaced (without rewiring).

Sign ballast rewiring that triggers the alterations requirements generally involves rewiring from parallel to series or visa versa, or when a ballast(s) is relocated within the same sign requiring relocating the wires. This does not include routine in-place ballast replacements.

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**Example 7-7****Question**

We are replacing 60 percent of the ballasts in a sign. Must we replace the remaining ballasts in the sign in order to comply with the Standards?

**Answer**

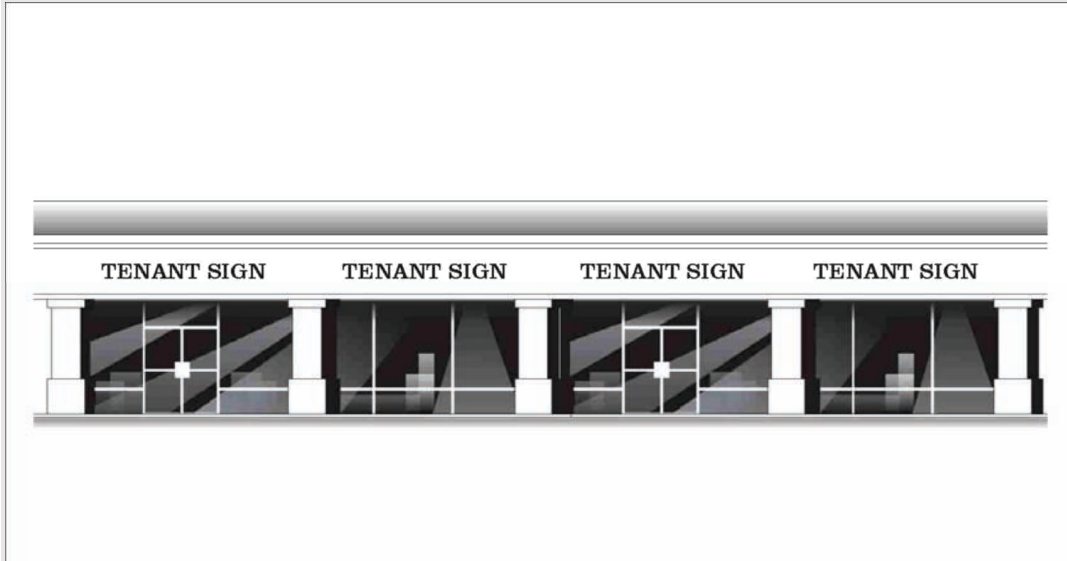
It depends. If more than 50 percent of the ballasts are being replaced, and the replacement involves rewiring the ballasts, then the alteration requirements apply to the whole sign. If more than 50 percent of the ballasts are being replaced during regular maintenance, and the ballasts are not being rewired, then the sign is not required to meet the Standards requirements. However, when existing wiring will allow the direct replacement of a magnetic ballast with a high efficiency high frequency electronic fluorescent ballast, even though Standards do not require the electronic ballast, the sign owner is encouraged to replace the magnetic ballasts with an electronic ballast.

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## Example 7-8

**Question**

I have a strip mall full of signs. Must I immediately bring all of these signs into compliance even if I'm not going to alter them?

**Answer**

No, only those signs in which at least 50 percent of the ballasts are replaced and rewired, or those signs that are moved to a new location (on the same property or different property) must comply with the sign lighting energy requirements. Also, all newly installed signs must also comply with the sign lighting energy requirements.

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## **7.6 Energy Compliance Documentation**

### **7.6.1 Overview**

This section describes the required documentation for compliance with the sign lighting energy requirements.

At the time the sign permit application is submitted to the enforcement agency, the applicant also submits the sign lighting energy compliance documentation.

The sign lighting energy compliance documentation is located in Appendix A of this manual (2013 Nonresidential Compliance Manual).

The sign lighting compliance documentation forms are designated as “NRCC-LTS”.

Sign lighting compliance documents for compliance with the 2013 Standards will be as follows:

**A. For the period of January 1 through December 31, 2014**

Sign lighting compliance documents are similar to the 2008 compliance documents, except they have been updated to reflect changes in the 2013 Standards.

**B. Starting on January 1, 2015**

The Energy Commission intends to have developed electronic compliance documents to replace existing nonresidential paper documents.

See chapter 2 of this manual for additional information about the data registry.

### **7.6.2 Sign Lighting Inspection**

The electrical building inspection process for sign lighting energy compliance is carried out along with the other building inspections performed by the authority having jurisdiction (AHJ = enforcement agency). The inspector relies upon the plans (when required for signs) and upon the NRCC-LTS-01-E Certificate of Compliance form.

### **7.6.3 Two Combined SLTG Forms**

There are two compliance forms required for compliance with the sign lighting Standards:

**A. Certificate of Compliance**

**B. Installation Certificate**

For convenience of the sign lighting industry, these two documents have been combined into one multi-use form for compliance with the sign lighting Standards. See section 5.1.4 of this manual for information about the Certificate of Compliance, and section 5.1.5 for information about the Installation Certificate.

### 7.6.4 Explanation of Compliance Document Numbering System

The numbering of compliance documentation has changed with the 2013 update to the Standards. Following is an explanation:

NRCC	Nonresidential Certificate of Compliance
LTS	Lighting, Signs
01	The sequential number of sets. For signs, there is only one set of documents
E	Developed primarily for the Enforcement (E) AHJ

### 7.6.5 Lighting Control Systems Installation Certificate

There is another installation certificate required when a lighting control systems or an energy management control systems is installed to comply with the sign lighting control requirements (discussed in chapter 5.1.6 of this manual), as follows:

- A. Before any lighting control system, or energy management control system will be recognized for compliance with the lighting requirements in Part 6 of Title 24, the person who is eligible under Division 3 of the Business and Professions Code to accept responsibility for the construction or installation of features, materials, components, or manufactured devices shall sign and submit the Installation Certificate (See section 7.2.4 of this chapter).
- B. If any of the requirements in the Installation Certificate fail the installation tests, that application shall not be recognized for compliance with Part 6 of Title 24.

For lighting control systems and for energy management control systems, there are Certificates of Installation for nonresidential indoor lighting (LTI), and for nonresidential outdoor lighting (LTO). However there is no similar document for sign lighting (LTS). Therefore, if sign lighting is controlled by a lighting control system, or by an energy management control system, the NRCI-LTI-02-E, or the NRCI-LTO-02-E, shall be used as a Certificate of Installation submitted for signs.

### 7.6.6 Instructions for filling out the NRCC-LTS-01-E

A copy of this four page document must be submitted to the enforcement agency at the time of building permit application. With enforcement agency approval, the applicant may use alternative formats of these documents (rather than the official Energy Commission forms), provided the information is the same and in a similar format.

#### **NRCC-LTS-01-E Page 1 of 4**

Project Name is the title of the project, as shown on the plans and known to the enforcement agency.

Date is the date of preparation of the compliance submittal package. It should be on or after the date of the plans, and on or before the date of the building permit application.

Project Address is the address of the project as shown on the plans and as known to the enforcement agency.

Project Address is the address where the sign is installed

Location of Sign – check appropriate box, to identify if this job includes Outdoor Signs, Indoor Signs, or both.

Phase of Sign Construction – check appropriate box to identify if this job includes New Signs, or Sign Alterations, or both.

Type of Lighting Control - check appropriate box to identify if the job includes New Lighting Controls, Replaced Lighting Controls, or Not Installing Lighting Controls (because someone else has accepted responsibility for the lighting controls).

This Certificate of Compliance includes the following components (check all that apply) – check appropriate box to indicate if this job includes installing the Mandatory Measures (Mandatory lighting Controls), uses the Maximum Allowed Lighting Power as the method to achieve compliance with the lighting power requirements in the Standards, and/or uses Specific Lighting Sources to achieve compliance with the lighting power requirements in the Standards.

The “documentation author” is the person who prepares a Title 24 Part 6 compliance document that must subsequently be reviewed and signed by a responsible person (see below) in order to certify compliance with Part 6. Subject to the requirements of §10-103(a)1 and §10-103(a)2, the person who prepares the Certificate of Compliance documents (documentation authors) shall sign a declaration statement on the documents they prepare to certify the information provided on the documentation is accurate and complete.

A documentation author may have additional certifications such as an Energy Analyst or a Certified Energy Plans Examiner certification number. Enter number in the EA# or CEPE# box, if applicable.

The person's telephone number is given to facilitate response to any questions that arise.

#### Responsible Person's Declaration Statement

The “responsible person” signing the Certificate of Compliance is required to be eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design, to certify conformance with Part 6. If more than one person has responsibility for the building design, each person (such as an eligible lighting designer) shall sign the Certificate of Compliance document(s) applicable to that portion of the design for which the person is responsible. Alternatively, the person with chief responsibility for the building design shall prepare and sign the Certificate of Compliance document(s) for the entire building design.

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### Section 3. Mandatory Sign Lighting Controls

NOTES. The following notes are listed on the compliance document for information.

1. The same responsible person may install both the sign lighting power and the sign lighting controls, or a different responsible person may install the sign lighting controls than the responsible person installing the sign lighting power.

2. The Mandatory Measures (sign lighting controls) are required for compliance with the sign lighting Standards. If the person responsible for installing the sign lighting power is not also responsible for the sign lighting controls, then the owner of the sign, general contractor, or architect shall be responsible to have the sign lighting controls installed.
3. If more than one person has responsibility for compliance, each responsible person shall prepare and sign a Certificate of Compliance and an Installation Certificate applicable to the portion of construction for which they are responsible; alternatively, the person with chief responsibility for construction shall prepare and sign the Certificate of Compliance Declaration Statement for the entire construction.

### **Section 3(a). Statements of Responsibility**

Someone is required to accept responsibility for the mandatory sign lighting controls. The mandatory lighting controls are as much a part of the sign lighting standards as the lighting power requirements are.

This section serves as a declaration statement, by the person signing this Certificate of Compliance, if they are the person responsible to install the sign lighting controls, or if someone else has accepted that responsibility.

The person signing the Certificate of Compliance Declaration Statement on page 1 shall complete at least Part 3a. Check Yes or No for all of the following statements:

- 1 I have responsibility for installing the sign lighting controls.  
 If Yes is checked, then also complete sections 3a and 3b of this document      If  
 No is checked, then complete only section 3a of this document
- 2 There are no existing sign lighting controls and I will be installing compliant sign lighting controls. Check Yes or No
- 3 There are no existing sign lighting controls and someone else will be responsible to install compliant sign lighting controls. Check Yes or No
- 4 There are existing sign lighting controls that do not comply with the applicable provision of §110.9 and §130.3 and I will be installing compliant sign lighting controls. Check Yes or No
- 5 There are existing sign lighting controls that do not comply with the applicable provision of §110.9 and §130.3 and someone else will be responsible to install compliant sign lighting controls. Check Yes or No

### **Section 3b. Mandatory Sign Lighting Controls**

If the person signing the Certificate of Compliance Declaration Statement on page 1 is responsible for complying with the sign lighting control requirements, that person shall answer all of the following questions:

If there are construction documents, indicate where on the building plans the mandatory measures (sign lighting controls) note block can be located:



- 1 §130.3(a)1. All indoor sign lighting is controlled with an automatic time-switch control or astronomical time-switch control. Check Yes (Y), No (N), or Not Applicable (NA)
- 2 §130.3(a)2A. All outdoor sign lighting is controlled with a photocontrol in addition to an automatic time-switch control, or an astronomical time-switch control. Check Yes (Y), No (N), or Not Applicable (NA)  
  
EXCEPTION to Section 130.3(a)2A: Outdoor signs in tunnels, and signs in large permanently covered outdoor areas that are intended to be continuously lit, 24 hours per day and 365 days per year. Check if this exception is applicable to this sign. Check Yes (Y), or Not Applicable (NA)
- 3 §130.3(a)2B. All outdoor sign lighting that is ON both day and night is controlled with a dimmer that provides the ability to automatically reduce sign lighting power by a minimum of 65 percent during nighttime hours. Signs that are illuminated at night and for more than 1 hour during daylight hours shall be considered ON both day and night. Check Yes (Y), No (N), or Not Applicable (NA).  
  
EXCEPTION to Section 130.3(a)2B: Outdoor signs in tunnels and large covered areas that are intended to be illuminated both day and night. Check if this exception is applicable to this sign. Check Yes (Y), or Not Applicable (NA).
- 4 §130.3(a)3. Demand Responsive Electronic Message Center Control. An Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW has a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal. Check Yes (Y), or Not Applicable (NA)  
  
EXCEPTION to Section 130.3(a)3: Lighting for EMCs that is not permitted by a health or life safety statute, ordinance, or regulation to be reduced by 30 percent. Check if this exception is applicable to this sign. Check Yes (Y), or Not Applicable (NA).

Field Inspector Notes: This section provides a space on the document for the field inspector to make notes.

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In addition to the mandatory sign lighting control requirements, there are two options for complying with the sign lighting power requirements, as follows:

1. Maximum Allowed Lighting Power, which is documented on this page of the compliance document, and
2. Specific Lighting Source, which is documents on page 4 of 4.

#### **Section 4. Maximum Allowed Lighting Power Method of Compliance**

##### **Certificate of Compliance and Field Inspection Energy Checklist**

This page is for documenting compliance when using the maximum allowed lighting power method. A sign which complies with the specific lighting source method is not required to comply with the maximum allowed lighting power method.

Fill out a separate row for each sign as follows:

- |           |   |
|-----------|---|
| Column A. | List the symbol or code used to identify the sign on the plans (when plans are required) and other documents.   |
| Column B  | A description of the sign, or location of sign on the building; and the location of the sign on construction documents.   |
| Column C  | <p>OPTIONAL – this is an optional, voluntary method for documenting that a sign complies with the lighting power requirements.</p> <p>Check this box only if this sign has a permanent, pre-printed, factory-installed, ENERGY VERIFIED label, confirming that the sign complies with the Section 140.8 of the California 2013 Title 24, Part 6 Standards, using the Maximum Allowed Lighting Power method of compliance.</p> <p>The only labels that will be recognized for this purpose are ENERGY VERIFIED Certification Marks authorized by Underwriters Laboratories (UL) or other Product Certification Body accredited to ISO/IEC Guide 65 by the American National Standards Institute in accordance with ISO/IEC 17011. Surveillance by the Accredited Certification Body shall be an ongoing annual inspection program carried out by a Type A Inspection body in accordance with ISO/IEC 17020. For signs with such an ENERGY VERIFIED label, columns 'D' through 'I' are not required to be filled out. Note: Using an ENERGY VERIFIED label is an optional method to validate compliance. An ENERGY VERIFIED label is not needed for compliance.</p> |
| Column D  | The sign area in square feet.   |
| Column E  | List "I" if the sign is an internally illuminated sign. List "E" if the sign is an externally illuminated sign.   |
| Column F  | Allowed watts per square foot. Enter 12 if the sign is listed as "I" in column E. Enter 2.3 if sign is listed as "E" in column E. These two numbers are the only numbers which can be used when using the maximum lighting power method of compliance.  |
| Column G  | Multiply the square footage in column D times the allowed Lighting Power Density (LPD = watts) in column F.   |
| Column H  | Show the total installed watts in the sign, as determined according to the applicable provisions of §130.0(c).  |
| Column I  | Enter 'Y' if the number in column 'H' is less than or equal to the number in column 'G'. This entry is a declaration that the sign complies with the sign lighting power requirements by using the maximum lighting power method of compliance. Otherwise, the sign does not comply.  |
| Column J  | This page doubles as a field inspection checklist.  |

Field Inspector Notes: This section provides a space on the document for the field inspector to make notes.

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#### **Specific Lighting Source Method of Compliance**

Certificate of Compliance and Field Inspection Energy Checklist

This page is for documenting compliance when using the specific lighting source compliance method. Watts per square foot are not required to be calculated when signs consist solely of one or more of the specified lighting technologies listed on this page.

Fill out a separate row for each sign as follows:

Column A.	List the symbol or code used to identify the sign on the plans (when plans are required) and other documents.
Column B	A description of the sign, or location of sign on the building; and the location of the sign on construction documents.
Column C	<p>OPTIONAL – this is an optional, voluntary method for documenting that a sign complies with the lighting power requirements.</p> <p>Check this box only if this sign has a permanent, pre-printed, factory-installed, ENERGY VERIFIED label, confirming that the sign complies with the Section 140.8 of the California 2013 Title 24, Part 6 Standards, using the Maximum Allowed Lighting Power method of compliance.</p> <p>The only labels that will be recognized for this purpose are ENERGY VERIFIED Certification Marks authorized by Underwriters Laboratories (UL) or other Product Certification Body accredited to ISO/IEC Guide 65 by the American National Standards Institute in accordance with ISO/IEC 17011. Surveillance by the Accredited Certification Body shall be an ongoing annual inspection program carried out by a Type A Inspection body in accordance with ISO/IEC 17020. For signs with such an ENERGY VERIFIED label, columns 'D' through 'I' are not required to be filled out. Note: Using an ENERGY VERIFIED label is an optional method to validate compliance. An ENERGY VERIFIED label is not needed for compliance.</p>
Column D	<p>Specific Light Source Compliance Method.</p> <p>In this cell, list one or more of the following numbers (1 through 9) to identify which of the specified lighting technologies are used to comply with the sign lighting power requirements:</p> <ol style="list-style-type: none"> <li>1 High pressure sodium lamps</li> <li>2 Metal halide lamps that are pulse start or ceramic served by a ballast that has a minimum efficiency of 88 percent or greater. Ballast efficiency is the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005.</li> <li>3 Metal halide lamps that are pulse start that are 320 watts or smaller, are not 250 watt or 175 watt lamps, and are served by a ballast that has a minimum efficiency of 80 percent.  Ballast efficiency is the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005.</li> <li>4 Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to a minimum efficiency of 75 percent when the transformer or power supply rated output current</li> </ol>

- is less than 50 mA. The ratio of the output wattage to the input wattage is at 100 percent tubing load.
- 5 Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to a minimum efficiency of 68 percent when the transformer or power supply rated output current is 50 mA or greater. The ratio of the output wattage to the input wattage is at 100 percent tubing load.
  - 6 Fluorescent lighting systems meeting one of the following requirements: A. Use only lamps with a minimum color rendering index (CRI) of 80; or B. Use only electronic ballasts with a fundamental output frequency not less than 20 kHz.
  - 7 Light emitting diodes (LEDs) with a power supply having an efficiency of 80 percent or greater;
  - 8 Single voltage external power supplies that are designed to convert 120 volt AC input into lower voltage DC or AC output, and have a nameplate output power less than or equal to 250 watts, shall comply with the applicable requirements of the Appliance Efficiency Regulations (Title 20).
  - 9 Compact fluorescent lamps that do not contain a medium screw base sockets (E24/E26).

Column E      This page doubles as a field inspection checklist.

Field Inspector Notes: This section provides a space on the document for the field inspector to make notes.